# SYNOPSIS OF THE GENUS PHILOGLOSSA

## (LIABEAE, ASTERACEAE)

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The South American genus Philoglossa was described originally by DeCandolle (1836) on the basis of material from near Lima, Peru. The genus was later redescribed by Hieronymus (1900, 1901) under the names Jaumea and Jaumeopsis, nom. nud. from Ecuador and Bolivia. These authors associated the plants with Helianthian and Helenian genera, as did Bentham and Hooker (1873) who placed the genus in the Helianthoideae subtribe Melampodieae. One species has been generally recognized in the genus with some indication of a second. Sandwith (1956) described a third species from northern Peru and mentioned other distinctive elements in the genus, but he ultimately recognized only two species. Sandwith cited important unpublished conclusions of S.F.Blake regarding relationship of Philoglossa to the genus Liabum, and this citation was repeated by Stuessey (1973). Detailed investigation of the present holdings of Philoglossa in the U.S. National Herbarium confirm the relationship suggested by Blake and the distinctions of some elements mentioned by Sandwith.

A carbon copy of Blake's letter to Sandwith has been seen and the comments on the relationship of the genus are as follows. "Philoglossa is not one of the Melampodiinae; its receptacle is naked and its disk achenes are by no means sterile. The only tribes of Bentham & Hooker or Hoffmann into which it could be put are Astereae, Helenieae, and Senecioneae. The style is not good for Astereae, and opposite leaves are very rare in that tribe. It does not go well in Helenieae in respect to involucre, style, or pappus. I am convinced that it belongs in the Liabinae of the Senecioneae." Blake goes on to cite the resemblance of involucre and styles to some species of Liabum and concludes, "The chief characters separating it from Liabum (in the broad sense) seem to be the compressed achene and the caducous (or sometimes wanting?) pappus. Sandwith did add mention of the Liabum-like leaf sheaths. A copy of Blake's unpublished notes on the genus includes mention of the long lobes of the disk corollas, the cordate-sagittate bases of the anthers, and the styles conspicuously hispidulous outside and without definite stigmatic lines. Characters of the genus previously unmentioned are the details of the nonglandular biseriate hairs of the corolla and the numerous small quadrate raphids of the achene wall, features common in related members of the Liabeae.

On the basis of the morphology and floral anatomy Philoglossa is placed with Liabum, Cacosmia (Cassini, 1819; Cabrera, 1954) and Chionopappus (Blake, 1935; Cabrera, 1954) in the distinct tribe Liabeae (Rydberg, 1927; Robinson & Brettell, 1973).

Philoglossa is a genus of erect or procumbent herbs bearing opposite leaves. The sheaths of the leaf bases are prominent and partially fused to each other on the sides. A distinction from Liabum is provided by the stiff hairs on the stems, leaves, pedicels and phyllaries. At least some of the hairs show distinctive enlarged basal cells. Heads are single on variously elongate scapes. Phyllaries are in 3-4 series with the outermost series having somewhat differentiated tips. Rays are in 1-2 series with styles more slender and less hispidulous than those of the disk flowers. Various counts of limited and often immature material indicate 30-50 disk flowers. The disk corollas have very long narrow lobes. Hairs near the bases of the corollas are of the common Liabum type, nonglandular, biseriate, and thin walled. Setae at the tips of the corolla lobes are more structurally continuous with the lobe and more like teeth with thickened cell walls. Large stomates are very prominent near the veins of the lobes. Anther bases project below the base of the anther collar. Exothecial cells are covered with a blackish outer layer. The cells are somewhat elongate with thickenings mostly on the lateral walls. Anther appendages are 1 - 1 1/2 as long as wide and are mostly flat. Ridges on the abaxial surface leave the middle depressed. The pollen is ca. 30 μ in diameter. Disk styles are hispidulous in the upper half and the branches are very short. The achenes of the ray and disk flowers are alike but various interspersed achenes usually fail to mature. The achenes are somewhat compressed and asymmetric, sometimes with 2-3 faint ribs. Groups of cells on the surface may form warts that have central cells with highly ornate walls. These warts may coalesce and form large wings on some achenes. The numerous quadrate cells in the walls of the achenes are each nearly filled by a quadrate raphid. The pappus is vestigial or lacking.

The only chromosome data for Philoglossa is the uncertain count of 2n = 36 by Diers (1961). The species cited by Diers was P. pterocarpa Sandw. but only P. peruviana is known in the region of the study.

The primary distribution and center of diversity of Philoglossa is in the coastal region of Peru. It is likely that the genus originated in the area. The western coastal range of Peru, characterized as a dry region, is known for its high degree of endemism. Many genera of the Angiosperms have experienced some degree of speciation in that area including; Tillandsia (Bromeliaceae); Fortunatia, Pasithea (Liliaceae); Cooperia (Amaryllidaceae); Tetragonia (Aizoaceae); Calandrinia, Portulaca (Portulacaceae); Spergularia, Drymaria (Caryophyllaceae); Hoffmanseggia (Leguminosae); Monnina (Polygalaceae); Palaua, Tarasa, Cristaria (Malvaceae); Heliotropium, Cryptantha,

Goldenia (Boraginaceae); Nolana (Nolanaceae) alone with more than 10 endemic species in the region; Viguiera, Perityle, Polyachyrus (Compositae). For further information see Ferreyra (1961). At least as significant phytogeographically are various endemic species and varieties of mosses (Robinson, 1970; 1971).

As recognized here, Philoglossa consists of four distinct species. Three species occur in the coastal region of Peru while one species occurs in the interior of Colombia, Ecuador, Peru and Bolivia. The four species can be distinguished by the following key.

1. Plants procumbent, rooting at lower nodes; inner phyllaries with veins usually not prominent; rays usually ca. 25; pappus lacking or of 1-2 very minute rather smooth setae (Colombia, Ecuador, Bolivia, interior of Peru). P. mimuloides

1. Plants erect, usually with roots only at base; inner phyllaries with veins usually prominent, discolored or forming ridges; rays mostly 30-40 2

2. Outer phyllaries as long as the inner, with narrow elongate tips; pappus of many short sparsely barbellate or lacerate squamellae (Tumbez, NW Peru). P. blakei

2. Outer phyllaries shorter than the inner, with short acute tips; pappus of 1-3 caducous setae or lacking 3

3. Leaves narrowly acute to acuminate, closely serrulate; plants usually much branched from lower nodes; achenes without pappus, some with prominent wings (Cajamarca, Peru). P. pterocarpa

3. Leaves short acute, entire to remotely serrulate; plants mostly with innovations from flowering nodes; achenes without pappus or with 1-3 caducous hispidulous awns, without prominent wings (Lima, Peru) P. peruviana

Details of the four species of Philoglossa are as follows.

Philoglossa blakei H. Robinson and J. Cuatrecasas, n. sp.

Plantae herbaceae erectae usque ad 60 cm altae; radicibus solum basilaribus. Caules teretes superne dense erecte vel retrorse hispidi, internodis plerumque 7-15 cm longis ultimis brevioribus. Folia opposita plerumque longe petiolata, petiolis 1-2 cm longis basi longe et anguste auriculatis, laminis 4-9 cm longis 1.5-4.5 cm latis anguste ovatis basi acutis ad apices anguste acutis vel parum acuminatis serrulatis raro dentatis. Inflorescentiae inconspicuae, pedicellis usque ad 3 cm longis; squamae involucri ca. 20 subequales ca. 8 mm longae, squamae exteriores basi pallide ovatae venosae 1.5 mm latae superne

virides lineares ca. 0.7 mm latae valde longe setiferae, squamae interiores lanceolatae usque ad 2 mm latae venosae pauce breviter setiferae; flores radii ca. 30?, squamellis pappi ca. 12 maxime 0.3 mm longis anguste linearibus subulatis et laceratis; flores disci ca. 30?, corollis ca. 4.5 mm longis basi hirsutis ad apices valde setiferis, thecis antherarum ca. 2.5 mm longis, appendicibus integris; squamellis pappi ca. 18 maxime 0.5 mm longis linearibus vel lineari-lanceolatis sparse barbellatis non caducis?

Type: PERU: Tumbez: Mts. S.E. of Hacienda la Choza, alt. 900-1000 m, deciduous bushwood. Annual herb, flowers yellow. Feb. 27-28, 1927. A. Weberbauer 7687 (holotype US).

The new species is most distinct in the more numerous more persistent pappus setae and in the longer narrower more setiferous tips on the outer phyllaries of the involucre. The limited and immature material prevents complete description of some features, but the species is obviously very distinct and easily recognizeable. Here as elsewhere in the genus, Sandwith (1956) seemed to anticipate possible specific status. He noted the narrow outer phyllaries and was able to cite Blake's careful observations on the pappus.

Philoglossa mimuloides (Hieron.) H.Robinson and J.Cuatrecasas, n. comb.

Jaumea mimuloides Hieron., Engl. Bot. Jahrb. 29: 52. 1900.

Procumbent to repent herbaceous plants up to 30 cm high, rooting prominently at the lower nodes, internodes 1-20 cm long but rather uniformly long in any one plant, internodes of innovations not unusually long; stems with setae comparatively sparse and often appressed. Leaves are persistent with petioles usually short being often 1 cm or less long; basal sheaths are usually prominent, sometimes 1 cm long. Leaf blades ovate to elliptical or obovate 1-5 cm long 0.7-3.0 cm wide, acute to obtuse, usually remotely serrulate, rarely prominently dentate. Inflorescences usually laterally displaced by innovations. Phyllaries 20-25 with innermost often hidden, unequal in length, not appearing prominently veined, outermost sometimes with some marginal setae near base, marginal setae more numerous near tips. Ray flowers 21-29 usually about 25, up to 15 mm long. Corollas densely hirsute below, tips of disk corolla lobes armed with many very stout setae. Anther thecae ca. 2 mm long, appendage about 1 1/2 times as long as wide with narrowly rounded entire tip. Achenes ca. 2 mm long, slightly flattened with 2-3 weak ribs, warty on surface and sometimes narrowly winged on upper part of ribs. Pappus lacking or of 1-3 very minute slenderly subulate, essentially smooth setae 0.2-0.3 mm long.

Specimens seen of typical form: ECUADOR: Azuay: Vicinity of Cuenca, J.N.Rose, Pachano & G.Rose 22833; Canyar: Asorgues, 9500 ft, Balls 7120; Loja: Vicinity of Loja, J.N.Rose, Pachano & G.Rose 23284; Pichincha: Near Quito, Jameson 775; Cordillera, Quito, bei Calicali, 2800 m, Lehmann 132; La Magdalina, Quinta

de los H.H., alt. 2800 m, Firmin 52; Zamora: Road from Loja to Zamora, km 45-51, elev. 1400-1600 m, Dodson & Thien 1467. PERU: Cachapoyas: Piura, Cerro Puma-urco, Ochoa 1640; Pasture 1.5 km southwest of Chachapoyas, elev. 2320 m, Wurdack 507; Middle and upper slopes of Puma-urcu southeast of Chachapoyas, elev. 2500-2700 m, Wurdack 542. (all US).

Various specimens are cited from marshy ground or along ditches. Ball 7120 is cited as mat forming along the margins of streams and irrigation canals, usually growing among grasses and fairly dense vegetation, in moist soil.

Philoglossa mimuloides forma sapida (Bristol) H.Robinson and J.Cuatrecasas, n. comb. Philoglossa peruviana var. sapida Bristol, Bot. Mus. Lfts. Harvard Univ. 20: 326. 1964. Specimen seen: COLOMBIA: Putumayo: Valle de Sibundoy, ca. 2200 m, 3 km se. Sibundoy, "Tsabajosha", decumbent herb to 80 cm; heads yellow; potherb, formerly cultivated, now a weed locally, Bristol 348 (paratype US). Bristol (1964) indicates that leaves of the plants are apparently eaten for flavoring in various boiled preparations. The non-cultivar is frequently boiled and fed to pigs.

Philoglossa mimuloides forma subintegrifolia Hieron. ex H.Robinson and J.Cuatrecasas, n. forma. Differt a forma typica foliis subintegris vel minute mucronato-denticulatis (mucronibus vel dentibus vix 0.5 mm altis) nec argute dentatis, corollis ligulatis radii usque ad 17 mm longis. Type: BOLIVIA: Songo, Bang 896 (holotype & isotype US). The original description of the form as a variety of Jaumeopsis mimuloides is invalid (Hieronymus, 1901).

The species was originally described without knowledge of relationship to the previously known peruvian species. Later workers have not distinguished the species though Sandwith (1956) called attention to the apparent difference in habit. The procumbent bases with rooting at the lower nodes are characteristic of the species. The species is also rather distinctive in its less prominently veined phyllaries, its outer phyllaries with few or no marginal setae near the base, and its less pubescent leaves and stems. The young leaves tend to lack the argenteous appearance often seen in the other species.

Philoglossa peruviana DC., Prodr. 5: 567. 1836.

Erect to decumbent herbaceous plants up to 75 cm high, roots usually restricted to base but sometimes occurring in other areas of soil contact, not necessarily at nodes, lower internodes usually very elongate, upper nodes often congested, innovations usually very divergent with long basal internodes; stems glabescent below, often densely hispid above with spreading setae. Leaves usually congested at flowering nodes, petioles usually 0.5 cm or less long, basal sheaths not very prominent; leaf blades usually broadly ovate 1.5-8.0 cm long 1.0-3.5 cm broad, shortly acute or rarely slightly acuminate,

remotely serrulate to subentire. Inflorescences usually central from flowering nodes. Phyllaries ca. 20 with others inside sometimes hidden, unequal in length, often prominently veined or even ribbed, outer phyllaries with margins densely setiferous to near base, with tips prominently discolored; ray flowers ca. 40, up to 15 mm long, corollas densely hirsute below, tips of disk corolla lobes with few or no stout setae; anther thecae ca. 1.7 mm long, appendage about as long as wide with rather truncated crenulate tip; achenes up to 2 mm long, sometimes with 2 slight ribs, with or without warts, without wings; pappus setae easily caducous, rarely found in place, usually seen as numerous linear-subulate hispidulous awns 0.7-1.8 mm long loose among achenes.

Specimens seen: PERU: La Libertad: Otusco, Secón, Sinsicap, 2355 m, Vargas 0035; Lima: Amancaes, vicinity of Lima, loma vegetation, Asplund 13735; Amancaes, 300-700 m, Soukup 2893; Lomas of Asia, 100 km s. of Lima, Grant 7490; Atocongo, a 28 km Sur de Lima, 400-500 m, Ferreyra 2437, 4022; Chaneay, Lomas de Lachay, 400-600 m, Vargas 9569, Velarde Nuñas 2289; Lurin, about 200 ft., Macbride 5957; Hill San Agustin, 400-480 m, Weberbauer 5694; Vicinity of Lima, San Agustin, shady place between boulders in loma, Asplund 13839; San Geronimo, about 500 ft., Macbride 5919; (all US).

This type species of the genus is actually the most geographically isolated and is in many ways the most distinct. The habit shows very elongate lower internodes and congested upper leaves. The pattern is repeated in the prominently spreading subfloral innovations. The inflorescences characteristically terminate the growth of the main stems. The leaves are rather distinct in the short acute tips. The phyllaries are more prominently veined and are more densely setiferous on the lower margins. The disk corollas are distinct in the few setae on the tips of the lobes. One of the most distinctive characters is in the minute anther appendages which are shorter than those of other species and have truncated crenulate tips rather than narrow entire tips.

The pappus awns of Philoglossa peruviana often become pressed into the surface of the receptacles and have sometimes been mistaken for paleae. The pappus is not present in all specimens but when it occurs it is distinctive.

Philoglossa pterocarpa Sandwith, Kew Bull. 1956: 292.

Erect to decumbent herbaceous plants with roots only at the base, usually with numerous leafy branches from lower nodes, internodes mostly 2-8 cm long, lower internodes not necessary elongated; upper stems with dense rather spreading pubescence. Leaves rather persistent, congested in immature upper parts of plant; petioles 4-7 mm long, sheaths mostly separated, 2-4 mm long; leaf blades ovate-lanceolate to elliptical 1.5-3.0 cm long 0.5-1.2 cm wide, base cuneate to obtuse, tip subacuminate to attenuate, entire to serrulate. Inflorescence not displaced

by innovations, pedicels 1.5-6.5 cm long. Head ca. 1.5 cm in diameter; involucre 8 mm high, phyllaries 3-4 seriate, ca. 26-29, unequal, outer phyllaries with lower margins less setiferous and tips lanceolate; ray flowers 29-43, more or less biseriate, 7.5-8.5 mm long; disk flowers ca. 33, corollas densely hirsute below, with many stout setae on tips of lobes; anther thecae 2.0-2.5 mm long, appendage 1 1/2 times as long as wide with narrowly rounded entire tip; achenes obovoid to 2 mm long, biconvex to trigonous, tuberculate to slightly winged, disk achenes with 2-4 sinuate-lacerate tipped wings up to 2.75 mm long and 1 mm or less wide; pappus not seen.

Specimen seen: PERU: Cajamarca: Llama, alt. 2060 m, Soukup 4219 (US). A second specimen of this or a closely related species: Cajamarca: Chota, Huambos, alt. ca. 2000 m, Soukup 4526 (US).

The species was originally distinguished on the basis of the erect branching habit and the wings on the achene. The presence of wings has not been confirmed in the immature topotypic material and the reliability of the character is not certain. Slight wings are of erratic occurrence in Philoglossa mimuloides and similar variability might be expected in P. pterocarpa. More important specific distinctions are the pappus and phyllaries unlike P. blakei, disk corollas with lobes setiferous, acuminate leaves, less setiferous phyllary margins, and entire anther appendages all unlike P. peruviana, and erect habit without roots at lower nodes unlike P. mimuloides. In recognizing this species, Sandwith (1956) eliminated the unifying element of P. peruviana sensu lato. It is unfortunate that Blake did not have an opportunity to complete his treatment of the genus as Sandwith must have expected.

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